

Wwamucha

10/5/1823

Page 1

=> fil reg	SINCE FILE	TOTAL
COST IN U.S. DOLLARS	ENTRY	SESSION
FULL ESTIMATED COST	0.21	0.21

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STRUCTURE FILE UPDATES: 25 JUL 2005 HIGHEST RN 856925-80-9  
DICTIONARY FILE UPDATES: 25 JUL 2005 HIGHEST RN 856925-80-9

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TSCA INFORMATION NOW CURRENT THROUGH JANUARY 18, 2005

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\*  
\* The CA roles and document type information have been removed from \*  
\* the IDE default display format and the ED field has been added, \*  
\* effective March 20, 2005. A new display format, IDERL, is now \*  
\* available and contains the CA role and document type information. \*  
\*  
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Structure search iteration limits have been increased. See HELP SLIMITS  
for details.

Experimental and calculated property data are now available. For more  
information enter HELP PROP at an arrow prompt in the file or refer  
to the file summary sheet on the web at:  
<http://www.cas.org/ONLINE/DBSS/registryss.html>

=> e dihydroxydiphenylsulfone/cn 5  
E1 1 DIHYDROXYDIPHENYLSILANE-N,N'-(4,4'-DIPHENYL)BISMALEIMIDE COPOLYMER/CN  
E2 1 DIHYDROXYDIPHENYLSILANE-TETRABUTOXYTITANIUM POLYMER/CN  
E3 0 --> DIHYDROXYDIPHENYLSULFONE/CN  
E4 1 DIHYDROXYDIPHENYLTELLURIUM/CN  
E5 1 DIHYDROXYDIPICOLINATE SYNTHASE (CHROMOBACTERIUM VIOLACEUM STRAIN ATCC 12472 GENE CV2825)/CN

=> e trihydroxytriphenylsulfone/cn 5  
E1 1 TRIHYDROXYSTEARIN/CN  
E2 1 TRIHYDROXYTETRAFLUOROPROPANOL/CN  
E3 0 --> TRIHYDROXYTRIPHENYLSULFONE/CN  
E4 1 TRIHYDROXYVINYLSILANE/CN  
E5 1 TRII PROTEIN (YERSINIA PSEUDOTUBERCULOSIS STRAIN IP32953 PLASMID PYV GENE TRII)/CN

=> s dihydroxy(1)diphenylsulfone  
358863 DIHYDROXY  
403 DIPHENYLSULFONE

Prepared by: Mary Hale @2-2507 Rem Bldg 1D86

L1 47 DIHYDROXY(L)DIPHENYLSULFONE

=> s trihydroxy(1)triphenylsulfone  
74472 TRIHYDROXY

0 TRIPHENYLSULFONE

L2 0 TRIHYDROXY(L)TRIPHENYLSULFONE

=> s trihydroxy(1)triphenylsulphone  
74472 TRIHYDROXY

0 TRIPHENYLSULPHONE

L3 0 TRIHYDROXY(L)TRIPHENYLSULPHONE

=> s trihydroxy(1)?phenylsulfone

LEFT TRUNCATION IGNORED FOR '?PHENYLSULFONE' FOR FILE 'REGISTRY'

74472 TRIHYDROXY

434 PHENYLSULFONE

L4 0 TRIHYDROXY(L)?PHENYLSULFONE

Left truncation is not valid in the specified search field in the specified file. The term has been searched without left truncation. Examples: '?TERPEN?' would be searched as 'TERPEN?' and '?FLAVONOID' would be searched as 'FLAVONOID.'

If you are searching in a field that uses implied proximity, and you used a truncation symbol after a punctuation mark, the system may interpret the truncation symbol as being at the beginning of a term. Implied proximity is used in search fields indexed as single words, for example, the Basic Index.

=> fil medl,biosis,embase,capplus;s (l1 or dihydroxydiphenylsulfone or dihydroxydiphenylsulphone)

COST IN U.S. DOLLARS	SINCE FILE .	TOTAL
	ENTRY	SESSION
FULL ESTIMATED COST	38.52	38.73

FILE 'MEDLINE' ENTERED AT 12:15:10 ON 26 JUL 2005

FILE 'BIOSIS' ENTERED AT 12:15:10 ON 26 JUL 2005

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FILE 'EMBASE' ENTERED AT 12:15:10 ON 26 JUL 2005

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FILE 'CAPPLUS' ENTERED AT 12:15:10 ON 26 JUL 2005

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L5 3 FILE MEDLINE

L6 2 FILE BIOSIS

L7 1 FILE EMBASE

L8 1120 FILE CAPPLUS

TOTAL FOR ALL FILES

L9 1126 (L1 OR DIHYDROXYDIPHENYLSULFONE OR DIHYDROXYDIPHENYLSULPHONE)

=> s trihydroxytriphenylsulfone or trihydroxy(1)triphenylsulfone or trihydroxy(1)triphenylsulphone

L10 0 FILE MEDLINE

L11 0 FILE BIOSIS

Page 3

L12 0 FILE EMBASE  
L13 0 FILE CAPLUS

TOTAL FOR ALL FILES

L14 0 TRIHYDROXYTRIPHENYLSULFONE OR TRIHYDROXY(L) TRIPHENYLSULFONE OR  
TRIHYDROXY(L) TRIPHENYLSULPHONE

=> s ?triphenylsulfone? or ?triphenylsulphone?

L15 0 FILE MEDLINE  
L16 0 FILE BIOSIS  
L17 0 FILE EMBASE  
L18 1 FILE CAPLUS

TOTAL FOR ALL FILES

L19 1 ?TRIPHENYLSULFONE? OR ?TRIPHENYLSULPHONE?

=> s l9 and l19

L20 0 FILE MEDLINE  
L21 0 FILE BIOSIS  
L22 0 FILE EMBASE  
L23 0 FILE CAPLUS

TOTAL FOR ALL FILES

L24 0 L9 AND L19

=> s (dissolv? or suspend?) and l9

L25 0 FILE MEDLINE  
L26 0 FILE BIOSIS  
L27 0 FILE EMBASE  
L28 46 FILE CAPLUS

TOTAL FOR ALL FILES

L29 46 (DISSOLV? OR SUSPEND?) AND L9

=> s alkali metal hydroxide and l29

L30 0 FILE MEDLINE  
L31 0 FILE BIOSIS  
L32 0 FILE EMBASE  
L33 0 FILE CAPLUS

TOTAL FOR ALL FILES

L34 0 ALKALI METAL HYDROXIDE AND L29

=> s crude and l29

L35 0 FILE MEDLINE  
L36 0 FILE BIOSIS  
L37 0 FILE EMBASE  
L38 4 FILE CAPLUS

TOTAL FOR ALL FILES

L39 4 CRUDE AND L29

=> d 1-4 ibib abs;s wakayama f?/au;s yanase n?/au;s kitahara t?/au;s nate n?/au

L39 ANSWER 1 OF 4 CAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2001:780846 CAPLUS

DOCUMENT NUMBER: 135:318322

TITLE: Semi-continuous method for producing 4,4'-  
dihydroxydiphenylsulfone from phenol and a  
sulfonating agent in heated water

INVENTOR(S): Pabst, Gunther; Kast, Juergen  
 PATENT ASSIGNEE(S): Basf A.-G., Germany  
 SOURCE: PCT Int. Appl., 16 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: German  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001079163	A1	20011025	WO 2001-EP4081	20010410
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
DE 10018580	A1	20011025	DE 2000-10018580	20000414
AU 2001054801	A5	20011030	AU 2001-54801	20010410
EP 1272462	A1	20030108	EP 2001-927904	20010410
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
JP 2003531137	T2	20031021	JP 2001-576765	20010410
US 2003149308	A1	20030807	US 2002-257328	20021010
US 6700020	B2	20040302		
PRIORITY APPLN. INFO.:			DE 2000-10018580	A 20000414
			WO 2001-EP4081	W 20010410

OTHER SOURCE(S): CASREACT 135:318322

AB A semi-continuous method for producing 4,4'-  
 dihydroxydiphenylsulfone comprises: (a) reacting phenol with a  
 sulfonating agent (e.g., concentrate sulfuric acid); (b) suspending  
 the resulting crude product in  $\geq 40^\circ$  water which is  
 free from inert organic solvents and can contain residual amts. of unreacted  
 phenol, and filtering off the product; and (c) returning the resulting  
 waste streams containing the educt and/or product to the production process.

Step

(b) is carried out using the crude product and water in a weight  
 ratio of 85:15 to 55:45.

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L39 ANSWER 2 OF 4 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 1995:356764 CAPLUS  
 DOCUMENT NUMBER: 122:119046  
 TITLE: A heat-sensitive recording material.  
 INVENTOR(S): Kobayashi, Norio; Takahashi, Toshiaki; Makino, Masahiro; Hosoda, Masaaki  
 PATENT ASSIGNEE(S): Nicca Chemical Co., Ltd., Japan  
 SOURCE: Eur. Pat. Appl., 11 pp.  
 CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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EP 616897	A2	19940928	EP 1994-104540	19940323
EP 616897	A3	19941214		
EP 616897	B1	19990616		
R: CH, DE, FR, GB, IT, LI				
JP 06270550	A2	19940927	JP 1993-89426	19930324
US 5378674	A	19950103	US 1994-216379	19940323
JP 1993-89426 A 19930324				

## PRIORITY APPLN. INFO.:

AB A heat-sensitive recording material comprises a heat-sensitive color forming layer which is formed on a supporter and contains a colorless or light color leuco dyestuff as a color forming substance, a developer which develops color of the leuco dyestuff by reaction with it when heated and a sensitizer. The developer is 2,4'-**dihydroxydiphenylsulfone** having purity of 97% or more and prepared by washing and drying crystal which is obtained by **dissolving crude 2,4'-dihydroxydiphenylsulfone** in an alc. having 1 to 4 C atoms or in a mixture of an alc. having 1 to 4 C atoms and H<sub>2</sub>O by heating and then cooling the solution or partially removing the solvent from the solution by distillation. The heat-sensitive recording material has excellent properties, such as reduced fog and excellent image preservation (weatherability).

L39 ANSWER 3 OF 4 CAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 1990:7167 CAPLUS  
 DOCUMENT NUMBER: 112:7167  
 TITLE: Process for the purification and isolation of mixtures of 4,4'- and 2,4'-**dihydroxydiphenylsulphone**  
 INVENTOR(S): Arient, Josef  
 PATENT ASSIGNEE(S): Czech.  
 SOURCE: Czech., 3 pp.  
 CODEN: CZXXA9  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Czech  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CS 257071	B1	19880415	CS 1986-6143	19860822
CS 1986-6143 19860822				

PRIORITY APPLN. INFO.:

AB PhOH is sulfonated at 180-190°, the crude product is dissolved in hot aqueous NaOH, and the solution is boiled with C to remove resinous and colored contaminants. The hot filtrate is decolorized with a 2-5% aqueous Na<sub>2</sub>S<sub>2</sub>O<sub>5</sub> solution and product (70%) containing the title compds. is separated with HCl from a cooled solution

L39 ANSWER 4 OF 4 CAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 1946:32301 CAPLUS  
 DOCUMENT NUMBER: 40:32301  
 ORIGINAL REFERENCE NO.: 40:6281c-e  
 TITLE: U.S. Government reports disclose German process developments  
 AUTHOR(S): Curtis, Francis J.; Fogler, F.  
 CORPORATE SOURCE: I.G. Farbenindustrie A.-G. Elherfeld and Leverkusen  
 SOURCE: Shoe and Leather Reporter (1946), 241(No. 11), 29-30  
 CODEN: SLREAY; ISSN: 0096-9257  
 DOCUMENT TYPE: Journal  
 LANGUAGE: Unavailable  
 AB Tanigan Extra A is a mixture of 4,4-dihydroxydiphenylsulfone (I)

and dihydroxydiphenylsulfone formaldehyde resin (II) in sulfite liquor (III). To prepare III treat raw CaHSO<sub>3</sub> waste liquor at 50° with 50% NaOH to pH 8.6, then at 55° with NaOH until no further precipitate of lime forms. Mix 0.5 hr., filter, let settle 12 hrs. until Ca content is less than 0.1%, then concentrate to 53% solids. To prepare I run

1600

I. of H<sub>2</sub>SO<sub>4</sub>.H<sub>2</sub>O into 9400 l. of crude phenol at 65° in 3 hrs.; heat under reduced pressure to 150°, distilling off 5000 l. of excess phenol and H<sub>2</sub>O in 30 hrs. Neutralize and dissolve in 520 l. of 50% NaOH and 2600 l. of H<sub>2</sub>O under pressure. The resin is prepared by stirring together 11,600 l. of III and 800 l. of I at 110°, adjusting to an alkali number of 4.0, then, at 65°, adding the necessary HCHO (approx. 60 l. per 100 kg. of sulfone) in 20 min. and heating to 105° until condensation is complete. Yield: 4.4 to 4.8 times the amount of phenol. Brief descriptions of preparation of Tanigans

Extra

B and Extra E are given.

L40 3 FILE MEDLINE  
L41 1 FILE BIOSIS  
L42 2 FILE EMBASE  
L43 1 FILE CAPLUS

TOTAL FOR ALL FILES  
L44 7 WAKAYAMA F?/AU

L45 32 FILE MEDLINE  
L46 26 FILE BIOSIS  
L47 29 FILE EMBASE  
L48 188 FILE CAPLUS

TOTAL FOR ALL FILES  
L49 275 YANASE N?/AU

L50 369 FILE MEDLINE  
L51 458 FILE BIOSIS  
L52 326 FILE EMBASE  
L53 994 FILE CAPLUS

TOTAL FOR ALL FILES  
L54 2147 KITAHARA T?/AU

L55 0 FILE MEDLINE  
L56 5 FILE BIOSIS  
L57 0 FILE EMBASE  
L58 21 FILE CAPLUS

TOTAL FOR ALL FILES  
L59 26 NATE N?/AU

=> s oi f?/au  
L60 7 FILE MEDLINE  
L61 10 FILE BIOSIS  
L62 2 FILE EMBASE  
L63 28 FILE CAPLUS

TOTAL FOR ALL FILES

L64 47 OI F?/AU

=> s 164 and 159 and 154 and 149

L65 0 FILE MEDLINE

L66 0 FILE BIOSIS

L67 0 FILE EMBASE

L68 2 FILE CAPLUS

TOTAL FOR ALL FILES

L69 2 L64 AND L59 AND L54 AND L49

=> d 1-2 ibib abs

L69 ANSWER 1 OF 2 CAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2003:875243 CAPLUS

DOCUMENT NUMBER: 139:350539

TITLE: Process for producing dihydroxydiphenyl sulfone by crystallization

INVENTOR(S): Oi, Fumio; Yanase, Norio;

Kitahara, Takayuki; Nate, Nobuyuki

PATENT ASSIGNEE(S): Konishi Chemical Ind. Co., Ltd., Japan

SOURCE: PCT Int. Appl., 12 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003091206	A1	20031106	WO 2003-JP5228	20030424
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
EP 1498412	A1	20050119	EP 2003-725653	20030424
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
PRIORITY APPLN. INFO.:			JP 2002-123646	A 20020425
			WO 2003-JP5228	W 20030424

AB Disclosed is a process for producing dihydroxydiphenyl sulfone in which only trihydroxytriphenyl disulfone and coloring impurities are effectively removed without changing the proportion of dihydroxydiphenyl sulfone isomers. The process for producing dihydroxydiphenyl sulfone is characterized by dissolving or suspending crude dihydroxydiphenyl sulfone containing trihydroxytriphenyl disulfone in an aqueous solvent, regulating the pH of the solution or suspension to 5 to 7, optionally cooling it, and separating out the dihydroxydiphenyl sulfone crystals precipitated. This process is superior in handability, safety, sanitation, and cost effectiveness since it uses

water instead of organic solvent. Thus, a mixture of 4,4'-dihydroxydiphenyl sulfone 75, 2,4'-dihydroxydiphenyl sulfone 20, and trihydroxytriphenyl disulfone 5 weight% (100 g containing 0.39 mol 4,4'- and 2,4'-dihydroxydiphenyl sulfone and trihydroxytriphenyl disulfone, APHA 1,000 in acetone solution) was treated with 300 g H<sub>2</sub>O and 8 g NaOH (0.2 mol, 0.5-times mole vs. the sulfones), dissolved under heating at 90°, adjusted to pH 6.5 by adding 50% aqueous H<sub>2</sub>SO<sub>4</sub>, and cooled to 35°, followed by filtration of the precipitated crystals, washing with water, and drying to give 92 g dry crystals containing 4,4'-dihydroxydiphenyl sulfone 78.9, 2,4'-dihydroxydiphenyl sulfone 21.0, and trihydroxytriphenyl disulfone 0.1 weight% (APHA 400 in acetone solution).

REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L69 ANSWER 2 OF 2 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 2003:841197 CAPLUS.  
 DOCUMENT NUMBER: 139:343510  
 TITLE: Process for manufacturing mixture of dihydroxydiphenylsulfone isomers  
 INVENTOR(S): Ogata, Eiji; Oi, Fumio; Yanase, Norio; Nate, Nobuyuki; Kitahara, Takayuki  
 PATENT ASSIGNEE(S): Konishi Kagaku Kogyo Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003306477	A2	20031028	JP 2002-352839	20021204
PRIORITY APPLN. INFO.:			JP 2002-38473	A 20020215

AB The title process comprises heating a crude mixture of 2,4'-dihydroxydiphenylsulfone (I), 4,4'-dihydroxydiphenylsulfone (II), water, and an alkali (0.55 equiv relative to the total amount of I and II), cooling the mixture, separating the crystals of II, and adding an acid to the separated liquid

The mixture obtained by the title process contains 25 to 50 weight% I. I and II are developers for thermal recording material.

COST IN U.S. DOLLARS	SINCE FILE ENTRY	TOTAL SESSION
FULL ESTIMATED COST	64.51	103.24
DISCOUNT AMOUNTS (FOR QUALIFYING ACCOUNTS)	SINCE FILE ENTRY	TOTAL SESSION
CA SUBSCRIBER PRICE	-4.38	-4.38

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STRUCTURE FILE UPDATES: 25 JUL 2005 HIGHEST RN 856925-80-9  
DICTIONARY FILE UPDATES: 25 JUL 2005 HIGHEST RN 856925-80-9

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TSCA INFORMATION NOW CURRENT THROUGH JANUARY 18, 2005

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\*  
\* The CA roles and document type information have been removed from \*  
\* the IDE default display format and the ED field has been added, \*  
\* effective March 20, 2005. A new display format, IDERL, is now \*  
\* available and contains the CA role and document type information. \*  
\*  
\*\*\*\*\*

Structure search iteration limits have been increased. See HELP SLIMITS for details.

Experimental and calculated property data are now available. For more information enter HELP PROP at an arrow prompt in the file or refer to the file summary sheet on the web at:

<http://www.cas.org/ONLINE/DBSS/registryss.html>

```
=> e "2,4'-dds"/cn 5
E1      1      2,4'-CYCLOHEXYLIDENEDIPHENOL/CN
E2      1      2,4'-DDE/CN
E3      0 --> 2,4'-DDS/CN
E4      1      2,4'-DDT/CN
E5      1      2,4'-DI(SEC-BUTYLAMINOPHENYL) ETHER/CN

=> e "4,4'-dds"/cn 5
E1      1      4,4'-DDD/CN
E2      1      4,4'-DDE/CN
E3      0 --> 4,4'-DDS/CN
E4      1      4,4'-DDT/CN
E5      1      4,4'-DECAMETHYLENEBIS(1,1-DIETHYLPiperazinium IODIDE) /CN

=> e "2,4'-dihydroxydiphenylsulfone"/cn
E1      1      2,4'-DIHYDROXYDIPHENYLMETHANE-4,4'-DIHYDROXYDIPHENYLMETHANE-
          PHENOL-FORMALDEHYDE POLYMER/CN
E2      1      2,4'-DIHYDROXYDIPHENYLMETHANE-FORMALDEHYDE COPOLYMER/CN
E3      0 --> 2,4'-DIHYDROXYDIPHENYLSULFONE/CN
E4      1      2,4'-DIISOCYANATO-1,1'-BICYCLOHEXYL/CN
E5      1      2,4'-DIISOCYANATO-1,2-DIPHENYLETHANE/CN
E6      1      2,4'-DIISOCYANATO-3'-(ETHYLMERCAPTO)DIPHENYL SULFIDE/CN
E7      1      2,4'-DIISOCYANATO-3'-CHLORODIPHENYL SULFIDE/CN
E8      1      2,4'-DIISOCYANATO-3'-CHLORODIPHENYL SULFONE/CN
E9      1      2,4'-DIISOCYANATO-3'-ETHYLDIPHENYL SULFIDE/CN
E10     1      2,4'-DIISOCYANATO-5-METHOXYDIPHENYL SULFIDE/CN
E11     1      2,4'-DIISOCYANATODIPHENYL ETHER/CN
E12     1      2,4'-DIISOCYANATODIPHENYL SULFIDE/CN

=> e "2,4'-dihydroxydiphenyl sulfone"/cn
E1      1      2,4'-DIHYDROXYCHALCONE/CN
E2      1      2,4'-DIHYDROXYDIBENZOYLMETHANE/CN
E3      1 --> 2,4'-DIHYDROXYDIPHENYL SULFONE/CN
```

E4 1 2,4'-DIHYDROXYDIPHENYL SULFONE-4,4'-DIHYDROXYDIPHENYL SULFON E-FORMALDEHYDE COPOLYMER/CN  
E5 1 2,4'-DIHYDROXYDIPHENYL SULFONE-4,4'-DIHYDROXYDIPHENYL SULFON E-FORMALDEHYDE-P-PHENOLSULFONIC ACID COPOLYMER/CN  
E6 1 2,4'-DIHYDROXYDIPHENYL SULFONE-4,4'-DIHYDROXYDIPHENYL SULFON E-PHENYLDICHLOROPHOSPHINE OXIDE POLYMER/CN  
E7 1 2,4'-DIHYDROXYDIPHENYLAMINE/CN  
E8 1 2,4'-DIHYDROXYDIPHENYLDIMETHYLMETHANE/CN  
E9 1 2,4'-DIHYDROXYDIPHENYLMETHANE/CN  
E10 1 2,4'-DIHYDROXYDIPHENYL METHANE-4,4'-DIHYDROXYDIPHENYL METHANE-PHENOL-FORMALDEHYDE POLYMER/CN  
E11 1 2,4'-DIHYDROXYDIPHENYL METHANE-FORMALDEHYDE COPOLYMER/CN  
E12 1 2,4'-DIISOCYANATO-1,1'-BICYCLOHEXYL/CN

=> s e3-e6

1 "2,4'-DIHYDROXYDIPHENYL SULFONE"/CN  
1 "2,4'-DIHYDROXYDIPHENYL SULFONE-4,4'-DIHYDROXYDIPHENYL SULFONE-F ORMALDEHYDE COPOLYMER"/CN  
1 "2,4'-DIHYDROXYDIPHENYL SULFONE-4,4'-DIHYDROXYDIPHENYL SULFONE-F ORMALDEHYDE-P-PHENOLSULFONIC ACID COPOLYMER"/CN  
1 "2,4'-DIHYDROXYDIPHENYL SULFONE-4,4'-DIHYDROXYDIPHENYL SULFONE-P HENYLDICHLOROPHOSPHINE OXIDE POLYMER"/CN  
L70 4 ("2,4'-DIHYDROXYDIPHENYL SULFONE"/CN OR "2,4'-DIHYDROXYDIPHENYL SULFONE-4,4'-DIHYDROXYDIPHENYL SULFONE-FORMALDEHYDE COPOLYMER"/CN OR "2,4'-DIHYDROXYDIPHENYL SULFONE-4,4'-DIHYDROXYDIPHENYL SULFONE-FORMALDEHYDE-P-PHENOLSULFONIC ACID COPOLYMER"/CN OR "2,4'-DIHYDROXYDIPHENYL SULFONE-4,4'-DIHYDROXYDIPHENYL SULFONE-P HENYLDICHLOROPHOSPHINE OXIDE POLYMER"/CN)

=> e "4,4'-dihydroxydiphenyl sulfone"/cn 5

E1 1 4,4'-DIHYDROXYDIPHENYL SULFIDE-ISOPHTHALOYL DICHLORIDE-TEREP HTHALOYL DICHLORIDE COPOLYMER, SRU/CN  
E2 1 4,4'-DIHYDROXYDIPHENYL SULFIDE-TEREPHTHALOYL CHLORIDE COPOLY MER, SRU/CN  
E3 1 --> 4,4'-DIHYDROXYDIPHENYL SULFONE/CN  
E4 1 4,4'-DIHYDROXYDIPHENYL SULFONE BIS(DOCOSANOATE)/CN  
E5 1 4,4'-DIHYDROXYDIPHENYL SULFONE BISFLUOROSULFATE/CN

=> s e3

L71 1 "4,4'-DIHYDROXYDIPHENYL SULFONE"/CN

=> fil medl,biosis,embase,capplus;s 170 or 171

COST IN U.S. DOLLARS	SINCE FILE ENTRY	TOTAL SESSION
FULL ESTIMATED COST	24.72	127.96
DISCOUNT AMOUNTS (FOR QUALIFYING ACCOUNTS)	SINCE FILE ENTRY	TOTAL SESSION
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L72 0 FILE MEDLINE  
L73 32 FILE BIOSIS  
L74 0 FILE EMBASE  
L75 1750 FILE CAPLUS

TOTAL FOR ALL FILES  
L76 1782 L70 OR L71

=> s "4,4'-dihydroxydiphenyl sulfone"  
L77 1 FILE MEDLINE  
L78 1 FILE BIOSIS  
L79 3 FILE EMBASE  
L80 750 FILE CAPLUS

TOTAL FOR ALL FILES  
L81 755 "4,4'-DIHYDROXYDIPHENYL SULFONE"

=> s "2,4'-dihydroxydiphenyl sulfone" ?  
ADDITIONAL CHARACTERS REQUIRED AFTER '?' FOR LEFT TRUNCATION  
Additional characters must follow the left truncation symbol in your search term. If your search term contains a punctuation mark before the truncation symbol and you are searching in a field that uses implied proximity, the system may interpret the truncation symbol as being at the beginning of a term. Implied proximity is used in search fields indexed as single words, for example, the Basic Index. To see which fields in the current file have left truncation, enter "HELP SFIELDS" at an arrow prompt (=>).

=> s "2,4'-dihydroxydiphenyl sulfone"  
L82 0 FILE MEDLINE  
L83 0 FILE BIOSIS  
L84 0 FILE EMBASE  
L85 170 FILE CAPLUS

TOTAL FOR ALL FILES  
L86 170 "2,4'-DIHYDROXYDIPHENYL SULFONE"

=> s (176 or 181 or 186) and (make or making or process?\ or produc?)  
<-----User Break----->

SEARCH ENDED BY USER  
SEARCH ENDED BY USER

=> s (176 or 181 or 186) and (make or making or process? or produc?)  
L88 0 FILE MEDLINE  
L89 8 FILE BIOSIS  
L90 1 FILE EMBASE  
L91 737 FILE CAPLUS

TOTAL FOR ALL FILES  
L92 746 (L76 OR L81 OR L86) AND (MAKE OR MAKING OR PROCESS? OR PRODUC?)

=> s tri hydroxy triphenyl sulfone or trihydroxy triphenyl sulfone or trihydroxytriphenyl sulfone  
L93 0 FILE MEDLINE  
L94 0 FILE BIOSIS

L95 0 FILE EMBASE  
L96 0 FILE CAPLUS

TOTAL FOR ALL FILES

L97 0 TRI HYDROXY TRIPHENYL SULFONE OR TRIHYDROXY TRIPHENYL SULFONE  
OR TRIHYDROXYTRIPHENYL SULFONE

=> s triphenylsulfone or triphenyl sulfone or trihydroxy(l) (sulfone or sulphone)  
L98 0 FILE MEDLINE  
L99 0 FILE BIOSIS  
L100 1 FILE EMBASE  
L101 6 FILE CAPLUS

TOTAL FOR ALL FILES

L102 7 TRIPHENYLSULFONE OR TRIPHENYL SULFONE OR TRIHYDROXY(L) (SULFONE  
OR SULPHONE)

=> s l102 and l92  
L103 0 FILE MEDLINE  
L104 0 FILE BIOSIS  
L105 0 FILE EMBASE  
L106 0 FILE CAPLUS

TOTAL FOR ALL FILES

L107 0 L102 AND L92

=> s l92 and crystal? and crude  
L108 0 FILE MEDLINE  
L109 0 FILE BIOSIS  
L110 0 FILE EMBASE  
L111 8 FILE CAPLUS

TOTAL FOR ALL FILES

L112 8 L92 AND CRYSTAL? AND CRUDE

=> s l112 not (l39 or l69)  
L113 0 FILE MEDLINE  
L114 0 FILE BIOSIS  
L115 0 FILE EMBASE  
L116 5 FILE CAPLUS

TOTAL FOR ALL FILES

L117 5 L112 NOT (L39 OR L69)

=> d 1-5 ibib abs

L117 ANSWER 1 OF 5 CAPLUS COPYRIGHT 2005 ACS on STN  
ACCESSION NUMBER: 2004:758798 CAPLUS  
DOCUMENT NUMBER: 141:277350  
TITLE: Process for preparing mixture of  
dihydroxydiphenylsulfone isomers  
INVENTOR(S): Oi, Satsuo; Yanase, Norio; Nate, Nobuyuki; Nagaoka,  
Etsuko  
PATENT ASSIGNEE(S): Konishi Kagaku Kogyo Co., Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004256422	A2	20040916	JP 2003-47540	20030225
PRIORITY APPLN. INFO.:			JP 2003-47540	20030225

AB In the manufacture of a mixture of 2,4'-dihydroxydiphenylsulfone (I) and 4,4'-dihydroxydiphenylsulfone (II) containing 10 weight% to 90 weight% I, said mixture of crude dihydroxydiphenylsulfone containing phenolsulfonic acid Ph ester (III) as impurity and a mixture of water and lower alc. (IV) containing  $\geq$  2 weight% IV are mixed and heated and then cooled, and the precipitating crystals are separated at pH 4 to 8. Thus, a mixture of crude II and I (II/I ratio = 67/33) containing 2.9 weight% III, water, methanol, and sodium hydroxide was stirred and heated until a solution was obtained at 69°C; said solution was cooled to 30°C to give crystals of I and II containing only 0.8 weight% III; the pH of said solution before the collection of the crystals was 6.8. A high quality heat-sensitive recording paper was produced using the title mixture

L117 ANSWER 2 OF 5 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 2004:756320 CAPLUS  
 DOCUMENT NUMBER: 141:277349  
 TITLE: Method for manufacturing a mixture of dihydroxydiphenylsulfone isomers  
 INVENTOR(S): Oi, Satsuo; Yanase, Norio; Nate, Nobuyuki; Nagaoka, Etsuko  
 PATENT ASSIGNEE(S): Konishi Kagaku Kogyo Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004256421	A2	20040916	JP 2003-47538	20030225
PRIORITY APPLN. INFO.:			JP 2003-47538	20030225

AB In the manufacture of a mixture of 2,4'-dihydroxydiphenylsulfone (I) and 4,4'-dihydroxydiphenylsulfone (II) containing 10 weight% to 90 weight% I, said mixture of crude dihydroxydiphenylsulfone containing phenolsulfonic acid Ph ester (III) as impurity, an alkaline substance (e.g., sodium hydroxide) at 0.02 to 0.4 equiv (relative to dihydroxydiphenylsulfone), and an aqueous solvent (e.g., water) are heated and mixed and then cooled, and the precipitating crystals are separated. The title method is industrially advantageous. Thus, a mixture of crude II and I (II/I ratio = 67/33) containing 2.9 weight% III, water, and sodium hydroxide was stirred and heated until a solution was obtained at 92°C; said solution was cooled to 60°C and kept at 60°C for 1 h to give crystals of I and II containing only 0.4 weight% III. A high quality heat-sensitive recording paper was produced using the title mixture

L117 ANSWER 3 OF 5 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 2003:678778 CAPLUS  
 DOCUMENT NUMBER: 139:230468  
 TITLE: Process for preparation of

INVENTOR(S) : dihydroxydiphenylsulfone isomeric mixtures  
 Oi, Fumio; Yanase, Norio; Nate, Nobuyuki  
 PATENT ASSIGNEE(S) : Konishi Chemical Ind. Co., Ltd., Japan  
 SOURCE: PCT Int. Appl., 20 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003070695	A1	20030828	WO 2003-JP1836	20030220
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
JP 2003313160	A2	20031106	JP 2002-319967	20021101
PRIORITY APPLN. INFO.:			JP 2002-46629	A 20020222
			JP 2002-319967	A 20021101

OTHER SOURCE(S) : CASREACT 139:230468  
 AB This invention pertains to a method for producing high-quality dihydroxydiphenylsulfone isomeric mixts. which cause color development (color formation) in non-image areas when used in thermal recording paper as the developer. Specifically, a process for the prodn of dihydroxydiphenylsulfone isomeric mixts., characterized by subjecting a solution or suspension of a crude isomeric mixture comprising 2,4'-dihydroxydiphenylsulfone and 4,4'-dihydroxydiphenylsulfone in an organic solvent to cooling and filtration successively; a process for the production of dihydroxydiphenylsulfone isomeric mixts., characterized by mixing a solution or suspension of a crude isomeric mixture comprising 2,4'-dihydroxydiphenylsulfone and 4,4'-dihydroxydiphenylsulfone in an organic solvent with an aqueous basic solution to extract the isomeric mixture into the aqueous basic solution, removing the resulting organic solvent layer by liquid-liquid separation, adding an acid to the resulting aqueous basic solution to precipitate crystals, and recovering the crystals by filtration. For example, phenol was treated with concentrate H<sub>2</sub>SO<sub>4</sub> in 1,2-dichlorobenzene to give a mixture of 2,4'-dihydroxydiphenylsulfone and 4,4'-dihydroxydiphenylsulfone (35/65).

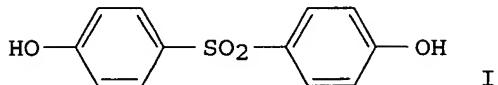
REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L117 ANSWER 4 OF 5 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 1988:610700 CAPLUS  
 DOCUMENT NUMBER: 109:210700  
 TITLE: Synthesis of bisphenol S  
 INVENTOR(S) : Cui, Xianghao; Wang, Yubin; et al.  
 PATENT ASSIGNEE(S) : Jilin University, Peop. Rep. China  
 SOURCE: Faming Zhuanq Shenqing Gongkai Shuomingshu, 4 pp.  
 CODEN: CNXXEV  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

## PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 87100796	A	19870902	CN 1987-100796	19870218
CN 87100796	B	19880907		
			CN 1987-100796	19870218
PRIORITY APPLN. INFO.:				
GI				



AB Bisphenol S (I), a widely useful industrial chemical, is prepared in an economical process without environmental pollution. A mixture of PhOH 198, com. H<sub>2</sub>SO<sub>4</sub> 100, and recovered mother liquor from a previous run 287 g was heated 3 h at 190°, cooled to 160°, 10-30% EtOH added at 90°, the solution cooled to 30-50° to precipitate 240 g I and 400 g mother liquor. The crude I of 97% purity was purified through activated C to give I of 99.8% purity.

L117 ANSWER 5 OF 5 CAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 1960:97352 CAPLUS

DOCUMENT NUMBER: 54:97352

ORIGINAL REFERENCE NO.: 54:18409d-i,18410a-i,18411a-i,18412a-g

TITLE: Action of thiols and sulfinic acids on quinol acetates. II

AUTHOR(S): Wessely, F.; Swoboda, J.; Schmidt, G.

CORPORATE SOURCE: Univ. Vienna

SOURCE: Monatshefte fuer Chemie (1960), 91, 57-78

CODEN: MOCMB7; ISSN: 0026-9247

DOCUMENT TYPE: Journal

LANGUAGE: Unavailable

GI For diagram(s), see printed CA Issue.

AB cf. CA 51, 12848a. In continuation of prior work (loc. cit.), the action of MeSH, NaSH, H<sub>2</sub>S, PhSH, MeSO<sub>2</sub>H, and PhSO<sub>2</sub>H with various o-quinol acetates (I) in the presence of various bases in different solvents was investigated. The above thiols gave m- or o-substituted phenols in addition to p-substituted phenols resulting from addition, cleavage of ACOH, and rearrangement reactions. MeSO<sub>2</sub>H and PhSO<sub>2</sub>H gave chiefly m-substituted phenols. The following I, CR'''':CR''.CR':CH.CR(OAc).CO were used (R, R', R'', R''' given): Me, H, H, H (II); Me, Me, H, H (III); Me, H, Me, H (IV); Me, Me, H, Me (V); Me, H, H, Me (VI); Et, H, H, Et (VII); Et, H, Ph, Et (VIII). The following results were obtained with the I and MeSH [I used, solvent, base, % o-substituted phenol, % m-substituted phenol, % p-substituted phenol, % reduction product (this was identical with that phenol which on oxidation with Pb(OAc)<sub>4</sub> gave the I used), sum of identified reaction products (%), reaction time given]: II, CH<sub>2</sub>Cl<sub>2</sub>, Et<sub>3</sub>N, 15 2,6-Me(MeS)C<sub>6</sub>H<sub>3</sub>OH (IX), 12 2,5-Me(MeS)C<sub>6</sub>H<sub>3</sub>OH (X), 69 2,4-Me(MeS)C<sub>6</sub>H<sub>3</sub>OH (XI), trace, 96, several days; II, CH<sub>2</sub>Cl<sub>2</sub>, Et<sub>3</sub>N, 13 IX, 11 X, 67 XI, trace, 91, 1 day; II, CH<sub>2</sub>Cl<sub>2</sub>, Ph<sub>3</sub>P, 11 IX, 3 X, 40 XI, trace, 54, several days; II, MeOH, Et<sub>3</sub>N, 10 IX, 34 X, 49 XI, trace, 93, several days; II, MeOH, MeONa, 7 IX, 47 X, 34 XI, trace, 88, 1 hr.; III, CH<sub>2</sub>Cl<sub>2</sub>, Et<sub>3</sub>N, 28 2,4,6-Me<sub>2</sub>(MeS)C<sub>6</sub>H<sub>2</sub>OH (XII), 5 2,4,5-Me<sub>2</sub>(MeS)C<sub>6</sub>H<sub>2</sub>OH (XIII), -, 57, 90, several days; III, MeOH, MeONa, 13 XII, 44 XIII, -, 38, 95, 1 hr.; V, CH<sub>2</sub>Cl<sub>2</sub>, Et<sub>3</sub>N, -, 14 2,4,6,3-Me<sub>3</sub>(MeS)C<sub>6</sub>HOH (XIV), -, 80, 94, several days;

V, MeOH, MeONa, -, 42 XIV, -, 54, 96, 1 hr.; VI, CH<sub>2</sub>Cl<sub>2</sub>, Et<sub>3</sub>N, -, 6 2,6,3-Me<sub>2</sub>(MeS)C<sub>6</sub>H<sub>2</sub>OH (XV), 64 2,6,4-Me<sub>2</sub>(MeS)C<sub>6</sub>H<sub>2</sub>OH (XVI), 18, 88, several days; VI, MeOH, MeONa, -, 28 XV, 38 XVI, trace, 66, 1 hr. Treatment of the I with NaSH gave the following results [I used, % o-, % m-, and % p-substituted phenol, resp., % reduction product, sum of identified reaction products (%) given]: II, 5 2,6-Me(HS)C<sub>6</sub>H<sub>3</sub>OH (XVII), -, 20 2,4-Me(HS)C<sub>6</sub>H<sub>3</sub>OH (XVIII), 23, 55 {in addition 7% [3,4-Me(HO)C<sub>6</sub>H<sub>3</sub>]<sub>2</sub>S was isolated as the sulfone (XIX) (see below)}; III, -, 10 2,4,6-Me<sub>2</sub>(HS)C<sub>6</sub>H<sub>2</sub>OH (XX), -, 65, 75; V, -, trace 2,4,6,3-Me<sub>3</sub>(HS)C<sub>6</sub>HOH, -, 79, 79; VI, 20 2,6,4-Me<sub>2</sub>(HS)C<sub>6</sub>H<sub>2</sub>OH (XXI), -, -, 38, 77 {in addition 19% [3,5,4-Me<sub>2</sub>(HO)C<sub>6</sub>H<sub>2</sub>]<sub>2</sub>SO<sub>2</sub> (XXII) was isolated as sulfone (see below)}. Treatment of the I with MeSO<sub>2</sub>H gave the following results (I used and % product obtained given): II, 91 2,5-Me(MeSO<sub>2</sub>)C<sub>6</sub>H<sub>3</sub>OH (XXIII); III, 94 2,4,5-Me<sub>2</sub>(MeSO<sub>2</sub>)C<sub>6</sub>H<sub>2</sub>OH (XXIV); IV, 16 2,5,4-Me<sub>2</sub>(MeSO<sub>2</sub>)C<sub>6</sub>H<sub>2</sub>OH (XXV); V, 88 2,4,6,3-Me<sub>3</sub>(MeSO<sub>2</sub>)C<sub>6</sub>HOH (XXVI); VI, 90 2,6,3-Me<sub>2</sub>(MeSO<sub>2</sub>)C<sub>6</sub>H<sub>2</sub>OH (XXVII). Treatment of the I with PhSH gave the following results (all products were isolated as sulfones) (I used, solvent, base, % o-, % m-, and % p-substituted phenol, resp., % reduction product, remarks given): II, MeOH, MeONa, -, 2,5-Me(PhSO<sub>2</sub>)C<sub>6</sub>H<sub>3</sub>OH (XXVIII), 0.8 2,4-Me(PhSO<sub>2</sub>)C<sub>6</sub>H<sub>3</sub>OH (XXIX), -, in addition 1% mixture probably of XXVIII and XXIX was obtained; III, MeOH, MeONa, 2,4,6-Me<sub>2</sub>(PhSO<sub>2</sub>)C<sub>6</sub>H<sub>2</sub>OH (XXX), 12 2,4,5-Me<sub>2</sub>(PhSO<sub>2</sub>)C<sub>6</sub>H<sub>2</sub>OH (XXXI), -, 30, in addition 5% mixture of XXX and XXXI was obtained; V, MeOH, MeONa, -, 6 2,4,6,3-Me<sub>3</sub>(PhSO<sub>2</sub>)C<sub>6</sub>HOH, -, 25, -, VI, MeOH, MeONa, -, 2,6,3-Me<sub>2</sub>(PhSO<sub>2</sub>)C<sub>6</sub>H<sub>2</sub>OH (XXXII), 2,6,4-Me<sub>2</sub>(PhSO<sub>2</sub>)C<sub>6</sub>H<sub>2</sub>OH (XXXIII), 2, 3% mixture of XXXII and XXXIII was obtained; VI, CH<sub>2</sub>Cl<sub>2</sub>, Et<sub>3</sub>N, -, -, 62 XXXIII, 19, -; VII, CHCl<sub>3</sub>, Et<sub>3</sub>N, -, -, 51 2,6,4-Et<sub>2</sub>(PhSO<sub>2</sub>)C<sub>6</sub>H<sub>2</sub>OH, -, -. The following results were obtained with the I and PhSO<sub>2</sub>H (I used and % product obtained given): VI, 68 XXXII; VII, 79 2,6,3-Et<sub>2</sub>(PhSO<sub>2</sub>)C<sub>6</sub>H<sub>2</sub>OH (XXXIV); VIII, 30 2,6,3,4-Et<sub>2</sub>Ph(PhSO<sub>2</sub>)C<sub>6</sub>HOH (XXXV). In the following exptl. work, methylation was accomplished in the usual way with excess Me<sub>2</sub>SO<sub>4</sub> and aqueous NaOH at room temperature. Oxidns. were effected

by dissolving the corresponding thioether in a little AcOH, adding 1.5 times the calculated amount of 30% H<sub>2</sub>O<sub>2</sub> (if the thioether precipitated, it was redissolved by dropwise addition of AcOH), allowing the mixture to stand overnight at room temperature, warming 30 min. on a H<sub>2</sub>O bath, precipitating the product with H<sub>2</sub>O, extracting oily product with CH<sub>2</sub>Cl<sub>2</sub>, washing the extract with saturated aqueous NaHCO<sub>3</sub>, drying, and evaporating; the residues

containing sulfones with free OH groups were crystallized by rubbing with Et<sub>2</sub>O; sulfones without free OH groups were distilled in vacuo; if crystalline product precipitated from the oxidation mixture, the mixture was kept several hrs. in a refrigerator, the precipitate filtered off, and washed

peroxide-free with dilute AcOH. In the reactions of the I with MeSH, NaSH, and H<sub>2</sub>S, mixts. of isomers were obtained in many cases, which were not quant. separable by the usual methods. In these cases, the yields given above were determined from other data. The compds. were identified by mixed m.p.s., vapor phase chromatography, and m.p. diagrams with pure compds. or related derivs. The I dissolved in just the required amount of absolute MeOH at

room temperature, the solution added dropwise with stirring during 1 hr. to MeSH in

MeOH-MeONa (content 0.5 g. MeSH, 0.53 g. Na in 10 ml. MeOH), the mixture allowed to stand 1 hr., poured into 3 vols. H<sub>2</sub>O, acidified with HCl, extracted with Et<sub>2</sub>O, the extract washed with H<sub>2</sub>O, dried, evaporated, and the residue distilled

gave a distillate whose composition was determined by gas chromatography. The separation

of the reduction products and the o-substituted phenols from m- and

p-substituted phenols was accomplished by fractional distillation. An analogous procedure was used for the isomeric mixture obtained from the I and H<sub>2</sub>S and NaSH. The I dissolved in just the required amount of solvent at room temperature,

the solution treated with MeSH (2-4 moles/mole I) and Et<sub>3</sub>N (0.05-0.1 ml./g. I), the mixture allowed to stand several days in a bomb tube, the solvent and excess MeSH evaporated, the residue taken up in Et<sub>2</sub>O, the Et<sub>2</sub>O solution washed with dilute HCl and saturated aqueous NaHCO<sub>3</sub>, and worked up as above gave the

products. The I with Ph<sub>3</sub>P (0.4 g./g. I) treated as in the Et<sub>3</sub>N expts., the solvent and excess MeSH evaporated, the residue taken up in dilute aqueous NaOH, the insol. Ph<sub>3</sub>P extracted with CH<sub>2</sub>Cl<sub>2</sub>, and the aqueous alkaline phase worked

up as in the Et<sub>3</sub>N experiment gave the products. The isolation and properties of only the newly prepared compds. here and below were as follows. A mixture of 15% X and 85% XI oxidized (H<sub>2</sub>O<sub>2</sub>) and the mixture recrystd. from dilute AcOH gave 2,4-Me(MeSO<sub>2</sub>)C<sub>6</sub>H<sub>3</sub>OH, m. 126-7°, methylated to the Me ether. Crude XIII, obtained by dlstn., recrystd. from petr. ether gave XIII, m. 51-2°; Me ether (XXXVI) m. 50-1° (petr. ether). Oxidation of XIII gave XXIV, m. 139-40° (dilute AcOH); Me ether (by oxidation of XXXVI) m. 122-4° (dilute AcOH). From the reaction of IV with MeSH with Et<sub>3</sub>N was isolated 42% unidentified compound, C<sub>12</sub>H<sub>20</sub>O<sub>3</sub>S, m. 127-8° (MeOH), v (CCl<sub>4</sub>) 1755, 1237, and 1089 cm.<sup>-1</sup> Crude XIV recrystd. from petr. ether gave XIV, m. 58-9°; Me ether b<sub>10</sub> 130-50°. Oxidation of XIV gave XXVI, m. 154-5°. The I dissolved in a little absolute MeOH, the solution added dropwise with stirring during 1 hr. to 20% NaSH-absolute MeOH, the mixture allowed to stand 1 hr., poured into 3 vols. H<sub>2</sub>O, acidified, exhaustively extracted with Et<sub>2</sub>O, the extract evaporated, and the product distilled to 150°/0.3 mm. gave a residue (larger amts. from the I with a free 4-position), which oxidized yielded the corresponding 4, 4'-dihydroxydiphenyl sulfones; the distillate

dissolved in a little MeOH, the solution treated with 5% aqueous HgCl<sub>2</sub>, the precipitate

(XXXVII) filtered off, and the filtrate worked up gave the corresponding reduced phenol; the XXXVII treated with Et<sub>2</sub>O-concentrated HCl and the Et<sub>2</sub>O layer

distilled gave the mercaptans, b<sub>0.3</sub> 60-100°. Thus was obtained XX, m. 38-40° (petr. ether); Me ether (XXXVIII) m. 45-6°. The I dissolved in the smallest amount of solvent (CH<sub>2</sub>Cl<sub>2</sub> in this case), the solution added dropwise with shaking to liquefied H<sub>2</sub>S (10 ml./g. I) followed by Et<sub>3</sub>N (1 drop/g. I), the mixture allowed to stand a specified time (2 days in this case) with continuous cooling with Dry Ice, the H<sub>2</sub>Sevapd., and the residue distilled to 150°/0.3 mm. gave 16% o-cresol (XXXIX) and (by oxidation of the mixture) 36% XIX. The above experiment repeated, allowed to stand

10 days, the mixture reduced in the cold with Zn and acid, and worked up gave 46% XXXIX, 2% XVII, 3% 2,5-Me(HS)C<sub>6</sub>H<sub>3</sub>OH (XL), 10% XVIII, and 2% XIX. The reaction repeated with absolute MeOH, the mixture allowed to stand 8 days, reduced in the cold with Zn and acid, and worked up gave 54% XXXIX, 0.4% XVII, 6% XL, 5% XVIII, and 4% XIX. III treated 2.5 days with H<sub>2</sub>S in CH<sub>2</sub>Cl<sub>2</sub>, the H<sub>2</sub>S evaporated, the residue treated with EtOH, the precipitate (40%)

filtered off, washed with EtOH, and recrystd. twice from EtOH gave XLI, m. 165-70° (decomposition); from the filtrate was isolated 38% 2,4-Me<sub>2</sub>C<sub>6</sub>H<sub>3</sub>OH. MeSO<sub>2</sub>Cl (3-4 g. for each g. I to be used) reduced by the procedure for the preparation of EtSO<sub>2</sub>Na (Houben-Weyl-Muller, Methods Organic Chemistry, Stuttgart, 1955, IX, p. 292), the resulting sirupy solution of MeSO<sub>2</sub>Na acidified with 5% MeOH-HCl under ice cooling until weakly acid to Congo red, the precipitate filtered off, washed with MeOH, the filtrate and

washings added to the I dissolved in the least amount of MeOH, the mixture allowed to stand 2 days, warmed 30 min., the MeOH distilled, the residue taken up in H<sub>2</sub>O, the solution scratched, allowed to stand some time in the cold, and the precipitate filtered off gave the product. Thus were obtained XXIII, m. 116-17° (dilute aqueous AcOH), and XXVII, m. 131-2° (aqueous MeOH). CH:CH.CMe:CH.C(OAc)2.CO (XLII) (2 g.) treated with MeSH solution (MeSH-MeOH-MeONa) as above, the mixture worked up, the oily product methylated in the cold, the mixture heated 15 min. on a H<sub>2</sub>O bath with excess aqueous NaOH, treated again with Me<sub>2</sub>SO<sub>4</sub>, worked up, the product distilled (b<sub>10</sub> 150-70°), and recrystd. from petr. ether gave 44% 4,1,2,5-Me(MeO)<sub>2</sub>(MeS)C<sub>6</sub>H<sub>2</sub>, m. 58-9°, oxidized to 90% corresponding sulfone (XLIII), m. 140-1° (dilute AcOH). XLII (1.5 g.) treated with MeSO<sub>4</sub>H like the I and the product saponified and methylated gave 1.12 g. XLIII. The I treated with PhSH (2 moles/mole I) as a 20% solution of PhSNa in absolute MeOH, the product dissolved in aqueous alkali, filtered, the filtrate acidified, extracted with Et<sub>2</sub>O, the extract

evaporated, the residue distilled to 150°/10 mm. (reduction product and excess PhSH), and the residual viscous oil oxidized gave the sulfones. The I treated with PhSH using Et<sub>3</sub>N (CA 51, 12848a) and the products oxidized gave the sulfones. Thus were obtained XXXIII, m. 242-4.5° (EtOH), and XXXIV, m. 157-60° [Me ether m. 65-6.5° (dilute AcOH)]. IV treated with PhCH<sub>2</sub>SH with MeOH-MeONa (usual procedure) gave 8% mesitol and 45% 2,4,6,3-Me<sub>3</sub>(PhCH<sub>2</sub>S)C<sub>6</sub>HOH (crude), b<sub>0.3</sub> 160-200°, m. 70-1° (petr. ether), oxidized to the sulfone, m. 158-9°. II and XVIII treated with Et<sub>3</sub>N [by Kotlan and Wessely's procedure (loc. cit.) for the reaction of the I with PhSH with Et<sub>3</sub>N], the solvent evaporated, and the residue oxidized gave 60% XIX, m. 274-6° (AcOH). VI treated similarly with XXI gave 40% XXII, m. 303-6° (AcOH). The appropriate I treated with PhSO<sub>2</sub>H (by the procedure of K. and W., loc. cit.) gave XXXII, m. 128-9° (dilute AcOH), XXXIV, m. 86-7° (dilute AcOH), and XXXV, m. 156-8° (dilute AcOH). Comparison syntheses: O-Carbethoxyphenolsulfonyl chlorides were prepared from the corresponding phenolsulfonic acid di-Na salts [procedure of Karrer and Laisser (CA 39, 5197) for an analogous compound]. Sulfonyl chlorides of phenol ethers were prepared by treating the latter with ClSO<sub>3</sub>H (Kolhatkar and Bokil, CA 25, 2126). The sulfonyl chlorides were reduced to mercaptans by the procedure of Karrer and L. (CA 39, 5197). Oxidation of 2,4-Me(MeS)C<sub>6</sub>H<sub>3</sub>OMe (Shah, et al., CA 28, 1248) gave 76% sulfone, m. 71-2° (dilute AcOH). Oxidation of 2,5-Me(MeS)C<sub>6</sub>H<sub>3</sub>OMe (loc. cit.) gave 78% sulfone, m. 104-5° (dilute AcOH). From 2,4-Me(NaO<sub>3</sub>S)C<sub>6</sub>H<sub>3</sub>ONa (Hultquist, et al., CA 46, 6608h) was prepared 69% 2,4-Me(NaO<sub>3</sub>S)C<sub>6</sub>H<sub>3</sub>OCO<sub>2</sub>Et (XLIV). From crude XLIV was prepared 91% 2,4-Me(C<sub>10</sub>O<sub>2</sub>S)C<sub>6</sub>H<sub>3</sub>OCO<sub>2</sub>Et (XLV), m. 48-9° (petr. ether). Crude XLV reduced, saponified, and the product (b<sub>10</sub> 130-60°) recrystd. several times from petr. ether gave XVIII, m. 41-2°. 3,5,2-Me<sub>2</sub>(MeO)C<sub>6</sub>H<sub>2</sub>NH<sub>2</sub> (CA 51, 12848a) diazotized in H<sub>2</sub>SO<sub>4</sub> solution, the diazonium solution converted by SO<sub>2</sub> (procedure of Shah, et al.,

CA

28, 1248) to crude 2,4,6-Me<sub>2</sub>(HO<sub>2</sub>S)C<sub>6</sub>H<sub>2</sub>OMe, the latter reduced, the mixture steam distilled, and the product distilled in vacuo gave 44% 2,4,6-Me<sub>2</sub>(HS)C<sub>6</sub>H<sub>2</sub>OMe (XLVI), b<sub>10</sub> 100-2°. XLVI methylated, the product (91%) distilled (b<sub>10</sub> 120-50°), and recrystd. from petr. ether gave XXXVIII, m. 45-6°, oxidized to 77% sulfone, m. 55-6° (dilute AcOH). 2,4,5-Me<sub>2</sub>(O<sub>2</sub>N)C<sub>6</sub>H<sub>2</sub>SO<sub>3</sub>Na hydrogenated with Raney Ni at 60°/50 atmospheric H pressure, filtered, the filtrate treated with 40 g. H<sub>2</sub>SO<sub>4</sub>, the solution treated with N oxide gas with ice-cooling and stirring until the solution colored KI-starch paper blue, added to hot dilute H<sub>2</sub>SO<sub>4</sub>, after N evolution ceased the mixture neutralized with BaCO<sub>3</sub>, filtered, the filtrate concentrated to 200 ml., treated with 13 g. NaOH and 35

g.  $\text{ClCO}_2\text{Et}$ , the solution evaporated to dryness, the residue ground with 100 g.  $\text{PCl}_5$ , the mixture decomposed with ice  $\text{H}_2\text{O}$ , and the precipitate filtered off gave 58

g. 2,4,5-Me<sub>2</sub>( $\text{ClO}_2\text{S}$ )C<sub>6</sub>H<sub>2</sub>OCO<sub>2</sub>Et (XLVII), amorphous; a portion extracted with boiling petr. ether and recrystd. using C gave XLVII, m. 52.5-4.0°.

Crude XLVII reduced, saponified, and the product distilled gave 4.8 g. 2,4,5-Me<sub>2</sub>(HS)C<sub>5</sub>H<sub>2</sub>OH, b<sub>10</sub> 120-50°, m. 90-2°, methylated to XXXVI, m. 50-1°. 2,4-Me<sub>2</sub>C<sub>6</sub>H<sub>3</sub>OMe converted with  $\text{ClSO}_3\text{H}$  to the 5-SO<sub>2</sub>Cl derivative, the latter reduced, the product isolated by steam distillation, purified by distillation (b<sub>10</sub> 120-50°), and recrystd. from petr. ether gave 2,4,5-Me<sub>2</sub>(HS)C<sub>6</sub>H<sub>2</sub>OMe, m. 37-9° (petr. ether), methylated to XXXVI. From 2,5-Me<sub>2</sub>C<sub>6</sub>H<sub>3</sub>OH was prepared 99% 2,5,4-Me<sub>2</sub>(NaO<sub>3</sub>S)C<sub>6</sub>H<sub>2</sub>ONA (XLVIII) (Hultquist, et al., CA 46, 6608h). From crude XLVIII was prepared 58% 2,5,4-Me<sub>2</sub>(NaO<sub>3</sub>S)C<sub>6</sub>H<sub>2</sub>OCO<sub>2</sub>Et, converted to 40% 2,5,4-Me<sub>2</sub>( $\text{ClO}_2\text{S}$ )C<sub>6</sub>H<sub>2</sub>OCO<sub>2</sub>Et (XLIX), m. 77-8° (petr. ether). XLIX reduced, saponified, and the product distilled (130-60°/10 mm.) gave 75% 2,5,4-Me<sub>2</sub>(HS)C<sub>6</sub>H<sub>2</sub>OH (L), m. 93-4° (petr. ether). L and equimolar amts. of MeI and NaOEt in EtOH heated 3 hrs. at 60° in a bomb tube gave 44% 2,5,4-Me<sub>2</sub>(MeS)C<sub>6</sub>H<sub>2</sub>OH, m. 96-7° (petr. ether), oxidized to 52% XXV, m. 143-4° (dilute AcOH). L methylated with MeI as above gave 62% XVI, m. 59-61° (petr. ether), oxidized to 62% sulfone, m. 156-7° (dilute AcOH). 4,1,2-Me(MeO)<sub>2</sub>C<sub>6</sub>H<sub>3</sub> treated with  $\text{ClSO}_3\text{H}$  gave 94% 5-SO<sub>2</sub>Cl derivative, m. 78-80°, reduced to 4,1,2,5-Me(MeO)<sub>2</sub>(HS)C<sub>6</sub>H<sub>2</sub>, m. 58-9° (petr. ether), methylated to 89% 4,1,2,5-Me(MeO)<sub>2</sub>(MeS)C<sub>6</sub>H<sub>2</sub>. 2,6-Et<sub>2</sub>C<sub>6</sub>H<sub>3</sub>OH oxidized with Pb(OAc)<sub>4</sub> (Metlesics, et al., CA 52, 11775a) gave 52% VII, b<sub>0.2</sub> 82-4°. VII treated with PhMgBr (method of Wessely, et al., CA 47, 9936a), the mixture steam distilled in vacuo, and the product distilled gave 3.4 g. 2,6,3-Et<sub>2</sub>PhC<sub>6</sub>H<sub>2</sub>OH (LI), b<sub>0.1</sub> 125-35°. LI (3.5 g.) oxidized with Pb(OAc)<sub>4</sub> in CHCl<sub>3</sub> gave 2.14 g. VIII, m. 105-6°, which gave by Thiele rearrangement (cf. Wessely and Metlesics, CA 49, 9529c) 73% 2,6,5,1,3-Et<sub>2</sub>Ph(HO)<sub>2</sub>C<sub>6</sub>H, m. 112-13°, not oxidized by FeCl<sub>3</sub> to a quinone.

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(FILE 'HOME' ENTERED AT 12:12:37 ON 26 JUL 2005)

FILE 'REGISTRY' ENTERED AT 12:12:50 ON 26 JUL 2005

E DIHYDROXYDIPHENYLSULFONE/CN 5  
E TRIHYDROXYTRIPHENYLSULFONE/CN 5

L1 47 S DIHYDROXY(L)DIPHENYLSULFONE  
L2 0 S TRIHYDROXY(L)TRIPHENYLSULFONE  
L3 0 S TRIHYDROXY(L)TRIPHENYLSULPHONE  
L4 0 S TRIHYDROXY(L)?PHENYLSULFONE

FILE 'MEDLINE, BIOSIS, EMBASE, CAPLUS' ENTERED AT 12:15:10 ON 26 JUL 2005

L5 3 FILE MEDLINE  
L6 2 FILE BIOSIS  
L7 1 FILE EMBASE  
L8 1120 FILE CAPLUS  
TOTAL FOR ALL FILES  
L9 1126 S (L1 OR DIHYDROXYDIPHENYLSULFONE OR DIHYDROXYDIPHENYLSULPHONE)  
L10 0 FILE MEDLINE  
L11 0 FILE BIOSIS  
L12 0 FILE EMBASE  
L13 0 FILE CAPLUS  
TOTAL FOR ALL FILES  
L14 0 S TRIHYDROXYTRIPHENYLSULFONE OR TRIHYDROXY(L)TRIPHENYLSULFONE 0

L15 0 FILE MEDLINE  
L16 0 FILE BIOSIS  
L17 0 FILE EMBASE  
L18 1 FILE CAPLUS  
TOTAL FOR ALL FILES  
L19 1 S ?TRIPHENYLSULFONE? OR ?TRIPHENYLSULPHONE?  
L20 0 FILE MEDLINE  
L21 0 FILE BIOSIS  
L22 0 FILE EMBASE  
L23 0 FILE CAPLUS  
TOTAL FOR ALL FILES  
L24 0 S L9 AND L19  
L25 0 FILE MEDLINE  
L26 0 FILE BIOSIS  
L27 0 FILE EMBASE  
L28 46 FILE CAPLUS  
TOTAL FOR ALL FILES  
L29 46 S (DISSOLV? OR SUSPEND?) AND L9  
L30 0 FILE MEDLINE  
L31 0 FILE BIOSIS  
L32 0 FILE EMBASE  
L33 0 FILE CAPLUS  
TOTAL FOR ALL FILES  
L34 0 S ALKALI METAL HYDROXIDE AND L29  
L35 0 FILE MEDLINE  
L36 0 FILE BIOSIS  
L37 0 FILE EMBASE  
L38 4 FILE CAPLUS  
TOTAL FOR ALL FILES  
L39 4 S CRUDE AND L29  
L40 3 FILE MEDLINE  
L41 1 FILE BIOSIS  
L42 2 FILE EMBASE  
L43 1 FILE CAPLUS  
TOTAL FOR ALL FILES  
L44 7 S WAKAYAMA F?/AU  
L45 32 FILE MEDLINE  
L46 26 FILE BIOSIS  
L47 29 FILE EMBASE  
L48 188 FILE CAPLUS  
TOTAL FOR ALL FILES  
L49 275 S YANASE N?/AU  
L50 369 FILE MEDLINE  
L51 458 FILE BIOSIS  
L52 326 FILE EMBASE  
L53 994 FILE CAPLUS  
TOTAL FOR ALL FILES  
L54 2147 S KITAHARA T?/AU  
L55 0 FILE MEDLINE  
L56 5 FILE BIOSIS  
L57 0 FILE EMBASE  
L58 21 FILE CAPLUS  
TOTAL FOR ALL FILES  
L59 26 S NATE N?/AU  
L60 7 FILE MEDLINE  
L61 10 FILE BIOSIS  
L62 2 FILE EMBASE  
L63 28 FILE CAPLUS  
TOTAL FOR ALL FILES  
L64 47 S OI F?/AU

L65 0 FILE MEDLINE  
L66 0 FILE BIOSIS  
L67 0 FILE EMBASE  
L68 2 FILE CAPLUS  
TOTAL FOR ALL FILES  
L69 2 S L64 AND L59 AND L54 AND L49

FILE 'REGISTRY' ENTERED AT 12:22:30 ON 26 JUL 2005  
E "2,4'-DDS"/CN 5  
E "4,4'-DDS"/CN 5  
E "2,4'-DIHYDROXYDIPHENYLSULFONE"/CN  
E "2,4'-DIHYDROXYDIPHENYL SULFONE"/CN  
L70 4 S E3-E6  
E "4,4'-DIHYDROXYDIPHENYL SULFONE"/CN 5  
L71 1 S E3

FILE 'MEDLINE, BIOSIS, EMBASE, CAPLUS' ENTERED AT 12:24:44 ON 26 JUL 2005  
L72 0 FILE MEDLINE  
L73 32 FILE BIOSIS  
L74 0 FILE EMBASE  
L75 1750 FILE CAPLUS  
TOTAL FOR ALL FILES  
L76 1782 S L70 OR L71  
L77 1 FILE MEDLINE  
L78 1 FILE BIOSIS  
L79 3 FILE EMBASE  
L80 750 FILE CAPLUS  
TOTAL FOR ALL FILES  
L81 755 S "4,4'-DIHYDROXYDIPHENYL SULFONE"  
L82 0 FILE MEDLINE  
L83 0 FILE BIOSIS  
L84 0 FILE EMBASE  
L85 170 FILE CAPLUS  
TOTAL FOR ALL FILES  
L86 170 S "2,4'-DIHYDROXYDIPHENYL SULFONE"  
L87 0 FILE MEDLINE  
L88 0 FILE MEDLINE  
L89 8 FILE BIOSIS  
L90 1 FILE EMBASE  
L91 737 FILE CAPLUS  
TOTAL FOR ALL FILES  
L92 746 S (L76 OR L81 OR L86) AND (MAKE OR MAKING OR PROCESS? OR PRODUC  
L93 0 FILE MEDLINE  
L94 0 FILE BIOSIS  
L95 0 FILE EMBASE  
L96 0 FILE CAPLUS  
TOTAL FOR ALL FILES  
L97 0 S TRI HYDROXY TRIPHENYL SULFONE OR TRIHYDROXY TRIPHENYL SULFONE  
L98 0 FILE MEDLINE  
L99 0 FILE BIOSIS  
L100 1 FILE EMBASE  
L101 6 FILE CAPLUS  
TOTAL FOR ALL FILES  
L102 7 S TRIPHENYLSULFONE OR TRIPHENYL SULFONE OR TRIHYDROXY(L) (SULFON  
L103 0 FILE MEDLINE  
L104 0 FILE BIOSIS  
L105 0 FILE EMBASE  
L106 0 FILE CAPLUS  
TOTAL FOR ALL FILES  
L107 0 S L102 AND L92

L108 0 FILE MEDLINE  
L109 0 FILE BIOSIS  
L110 0 FILE EMBASE  
L111 8 FILE CAPLUS  
TOTAL FOR ALL FILES  
L112 8 S L92 AND CRYSTAL? AND CRUDE  
L113 0 FILE MEDLINE  
L114 0 FILE BIOSIS  
L115 0 FILE EMBASE  
L116 5 FILE CAPLUS  
TOTAL FOR ALL FILES  
L117 5 S L112 NOT (L39 OR L69)

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